

NON-PUBLIC?: N
ACCESSION #: 8911020271
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Cooper Nuclear Station PAGE: 1 OF 3

DOCKET NUMBER: 05000298

TITLE: Unplanned Main Turbine Trip and Subsequent Scram Caused by
Spurious Main Turbine Hydraulic Control Oil Reservoir Low Level
Signal

EVENT DATE: 09/28/89 LER #: 89-025-00 REPORT DATE: 10/27/89

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Ralph W. Krause TELEPHONE: 402-825-3811

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On September 28, 1989, at 11:36 AM, a main turbine trip occurred, followed immediately by a reactor scram. The Reactor vessel water level transient that resulted from the scram caused containment isolation Groups 2 (Primary Containment) 3 (Reactor Water Cleanup) and 6 (Secondary Containment) to occur. The turbine trip signal that initiated the event was turbine hydraulic control oil reservoir low level, which occurred approximately two minutes after the control oil pumps were shifted. It was later verified that reservoir level had remained in the normal range throughout the event.

The exact cause for the turbine hydraulic control oil reservoir low level trip signal could not be positively identified. It was concluded the trip signal was caused by spurious actuation of the level switch due to equipment vibration as a result of shifting control oil pumps.

The immediate actions taken were to stabilize the plant following the scram. To minimize the possibility of recurrence, a temporary instruction was issued to limit control oil pump shifting, and a control oil system flush was scheduled for the next outage. Additionally, several system reliability improvements will be evaluated.

END OF ABSTRACT

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A. EVENT DESCRIPTION

On September 28, 1989, at 11:36 AM, a main turbine trip occurred, followed immediately by a reactor scram. The reactor vessel water level transient that resulted from the scram caused containment isolation Groups 2 (Primary Containment), 3 (Reactor Water Cleanup) and 6 (Secondary Containment including the initiation of Standby Gas Treatment) to occur. The turbine trip signal that initiated the event was turbine hydraulic control oil reservoir low level, which occurred approximately two minutes after the Control Room Operator shifted running turbine hydraulic control oil pumps. The reservoir low level signal also tripped the running control oil pump. The trip signal was manually reset immediately following the turbine trip, and both control oil pumps restarted. It was subsequently verified that the actual reservoir level remained within the normal operating range (approximately 75% full) throughout the event. The control oil system was supplied by Westinghouse, the turbine generator manufacturer.

B. PLANT STATUS

At the time of the event, the plant was operating at 100% of rated power (791 MWe).

C. BASIS FOR REPORT

The report is being submitted in accordance with 10CFR50.73(a)(2)(iv), the unplanned actuation of an Engineered Safety Feature; specifically, the actuation of the Reactor Protection System, Primary Containment Isolation System, and Standby Gas Treatment System.

D. CAUSE

The exact cause for the turbine hydraulic control oil reservoir low

level trip signal could not be positively identified. The reservoir level switch (Magnetrol Model A-153) was tested in place, removed from the reservoir and inspected, and the logic circuit components and wiring inspected and tested, all with satisfactory results. Control oil system performance tests were also attempted. However, system characteristics are sufficiently different while shutdown, such that duplicating system performance was not possible. Through a rigorous root cause analysis, it was subsequently concluded that the trip signal could only have been caused by a spurious actuation of the level switch due to equipment vibration. It is believed the vibration was caused by abnormal unloader valve actuations as a result of shifting the control oil pumps.

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E. SAFETY SIGNIFICANCE

None. The design basis transient for this condition is a turbine trip without bypass valve operation. Although the control oil pump tripped when the main turbine tripped, sufficient control oil pressure was available via the installed accumulators to immediately open the bypass valves. Because of the prompt action of the Control Room Operators to reset the reservoir low level trip signal and restart the control oil pumps, continued bypass valve operation was assured, and the transient was enveloped by the analyzed transient.

F. SAFETY IMPLICATIONS

Minimal. As previously stated, the design basis transient for this condition is a turbine trip without bypass valve operation. If the Control Room Operators had not, or could not reset the reservoir low level trip signal, the plant transient would have been within the design basis analysis. The pressure relief system and both the High Pressure Coolant Injection and Reactor Core Isolation Cooling systems were available, as well as the Suppression Pool Cooling mode of the Residual Heat Removal system to mitigate the event.

G. CORRECTIVE ACTION

The immediate corrective actions taken to respond to the reactor scram and main turbine trip were to reset the turbine control oil reservoir low level trip signal, start the control oil pumps, reestablish pressure control via the bypass valves and to stabilize the plant.

Following a rigorous root cause analysis, it was determined that the

turbine trip could only have been caused by spurious operation of the control oil reservoir level switch. To minimize the possibility of recurrence, a temporary Operations Department Special Order was issued to limit the shifting of control oil pumps while the main turbine is operating, and an extensive control oil system flush is scheduled for the next refueling outage. Furthermore, several items will be evaluated as potential changes to improve system reliability prior to the 1990 refueling outage: reevaluate the vendor preventive maintenance recommendations for the control oil system unloader valves, and determine the feasibility of modifying the control oil reservoir low level trip logic.

H. PAST SIMILAR EVENTS

None.

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COOPER NUCLEAR STATION
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Nebraska Public Power District TELEPHONE (402) 825-3811

CNSS896010

October 27, 1989

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Dear Sir:

Cooper Nuclear Station Licensee Event Report 89-025 is being forwarded as an attachment to this letter.

Sincerely,

G. R. Horn
Division Manager of
Nuclear Operations
Cooper Nuclear Station

GRH:sg

Attachment

cc: R. D. Martin
L. G. Kuncel
R. E. Wilbur
V. L. Wolstenholm
G. A. Trevors
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